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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 100893.0001P	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/25271	International filing date (day/month/year) 01 August 2003 (01.08.2003)	Priority date (day/month/year) 05 August 2002 (05.08.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): G06F 17/30 and US Cl.: 707/5; 710/65; 717/161		
Applicant FISH, ROBERT		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 02 March 2004 (02.03.2004)	Date of completion of this report 17 August 2004 (17.08.2004)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703)305-3230	Authorized officer <i>Michelle L. Green</i> Tony Mahmoudi Telephone No. 703-305-5887

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US03/25271

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed.
- ☒ the description:
 pages 1-17 as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☒ the claims:
 pages 18-19, as originally filed
 pages 18, as amended (together with any statement) under Article 19
 pages 18, filed with the demand
 pages 18, filed with the letter of 06 July 2004 (06.07.2004)
- ☒ the drawings:
 pages 1-4, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages NONE, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☒ the claims, Nos. 4
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)

Claims 2 and 6 YES

Claims 1, 3, and 5 NO

Inventive Step (IS)

Claims NONE YES

Claims 1-3, and 5-6 NO

Industrial Applicability (IA)

Claims 1-3 and 5-6 YES

Claims NONE NO

2. CITATIONS AND EXPLANATIONS

Please See Continuation Sheet

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

1. Claims 1, 3, and 5, lack novelty under PCT Article 33(2) as being anticipated by Hunter et al (U.S. Patent No. 5,605,690.)

As to claim 1, Hunter et al teaches a method (see Abstract) for creating a deterministic finite state automata (FSA) (see Abstract, where "creating a deterministic finite state" is read on "an automaton is constructed corresponding to the text string query"), that match patterns in parallel (see column 4, lines 31-36), comprising:

creating states of the finite state automata from a set of patterns to be matched (see column 7, lines 27-53);
passing over the set of patterns a second time (see column 16, lines 8-25, where "passing over a second time" is read on "examined again"); and
adding transitions to the states (see column 4, lines 32-37) to exactly match all possible patterns that can start within the set of patterns to be matched (see column 7, lines 27-41.)

As to claim 3, Hunter et al teaches a method of creating a deterministic FSA (see Abstract, where "creating a deterministic finite state" is read on "an automaton is constructed corresponding to the text string query") that uses array-based transitions for an alphabet of size N, comprising:

representing each state as an object containing an array of N pointers to possible successive states (see column 14, lines 41-49, and see column 23, lines 1-10); and
using a numeric value of each member of the alphabet as an offset into the array to point to a next state (see column 13, lines 11-22.)

As to claim 5, Hunter et al teaches a method for matching patterns in a deterministic FSA (see Abstract, where "creating a deterministic finite state" is read on "an automaton is constructed corresponding to the text string query"), comprising:

using a numeric value of less than a complete set of bits of an input as an offset into an array (see column 13, lines 11-22, thereby reducing a size of the array (see column 16, lines 8-14.)

2. Claims 2 and 6 lack inventive step under PCT Article 33(3) as being obvious over Hunter et al (U.S. Patent No. 5,606,690) in view of Major et al (U.S. Patent No. 5,455,932.)

As to claim 2, Hunter et al teaches the method further comprising:

iterating through the states (see column 15, lines 10-38, where "iterating through the states" is read on "transition between state 400 and state 410");

determining whether input causes a move to an initial state (see column 15, lines 39-60); and

if the initial state has a different move on the input, changing a current state's transition (see column 14, lines 50-58.)

Hunter et al does not teach the current state mirroring the initial state.

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Major et al teaches a fault-tolerant backup system (see Abstract), wherein he teaches the current state mirroring the initial state (see column 4, line 63 through column 5, line 1, and see column 10, lines 45-48.)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Hunter et al to include the current state mirroring the initial state.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Hunter et al by the teaching of Major et al, because including the current state mirroring the initial state would enable the system to run on a duplicate of the initial state without actually switching states from current to the initial state.

Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior arts of record do not disclose, teach, or suggest the claimed limitations of (in combination with all other features in the claim):

the method of claim 5 comprising a further step of using a hash function for matching patterns composed of a 128 or 256 alphabet without overhead of larger arrays, as claimed in claim 6.

US 5,455,932 (MAJOR et al) 03 October 1995, See Abstract, column 4, line 63 through column 5, line 1, and see column 10, lines 45-48.

CLAIMS

What is claimed is:

1. A method for creating a deterministic finite state automata (FSA) that match patterns in parallel, comprising:
creating states of the finite state automata from a set of patterns to be matched;
passing over the set of patterns a second time; and
adding transitions to the states to exactly match all possible patterns that can start within the set of patterns to be matched.
2. The method of claim 1 further comprising:
iterating through the states;
determining whether input causes a move to an initial state; and
if the initial state has a different move on the input, changing a current state's transition to mirror that of the initial state.
3. A method of creating a deterministic FSA that uses array-based transitions for an alphabet of size N, comprising:
representing each state as an object containing an array of N pointers to possible successive states;
using a numeric value of each member of the alphabet as an offset into the array to point to a next state.
4. A method for matching patterns in a deterministic FSA, comprising:
using a numeric value of less than a complete set of bits of an input as an offset into an array, thereby reducing a size of the array.
using a numeric value of less than a complete set of bits of an input as an offset into an array, thereby reducing a size of the array.
5. The method of claim 4 comprising a further step of using a hash function for matching patterns composed of a 128 or 256 alphabet without overhead of larger arrays.